



# ÉCOLE DOCTORALE

## SCIENCES DE LA TERRE ET DE L'ENVIRONNEMENT ET PHYSIQUE DE L'UNIVERS, PARIS

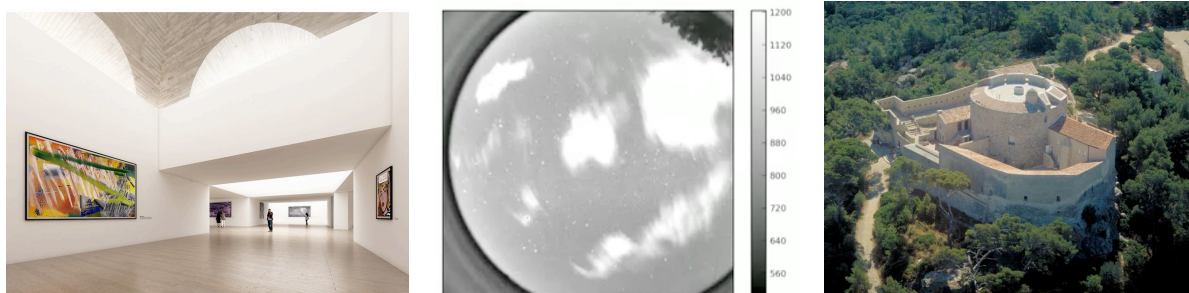
**Subject title: The role of the space-images in contemporary art related to the Earth-ocean-atmosphere system: from semiology to art-installation**

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Host lab/ Team: **IPGP- Team Planetology and Space Science– UMR7154**

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Doctoral contract without teaching assignment

### ***Presentation of the subject:***



*From left to right: inside of the Carmignac Foundation in Porquerolles; raw image of an airglow camera installed in Tahiti, and Fort Sant'Agathe in Porquerolles, potential location of the installation and the OH airglow camera.*

The subjective interpretation of natural phenomena marked the pre-Galilean science and pushed the Physics to split into proto-sciences, with languages and formalisms specific to the observation of a well-defined class of phenomena. This taxonomy of Physics produces a rapid advance of the specific knowledge but, on the other hand, it imposes limits in the discovery of the mutual interactions between the different separate disciplines. E.g., Seismology, which considers the surface of the Earth as free, neglects the atmosphere; the Atmospheric Physics, consider this same surface a rigid barrier, unaware of any seismic activity; they are the example of this separation and limit in highlight the exchange of energy between the solid part of the Earth and the fluid envelopes.

In the history, Earthquakes created many different mythological or philosopher-naturalistic interpretations. Notwithstanding the strong mythological interpretation of Poseidon moving the bowels of the Earth with his trident, the Greek School found natural causes for this shake -in Greek σεισμος which gave in the modern era, the name to *Seismology*. Most of the developed natural theories explored the idea that the Earth contains galleries and cavities. According to Anaxagore, the cavities are flooded and shaken by violent fires of flammable materials, such as tar and sulfur. According to Plato, the cavities are invaded by the currents of the *Pyriphlegethon*, an immense river of fire in the center of the Earth. Epicurus prefers to replace the fire with incessant streams.

Among these hypotheses, Aristotle anticipate -in his pneumatic theory- the idea of the coupling between the solid Earth and the atmosphere. Aristotle supposed that *pneuma* was the cause of earthquakes.

This force, due to the compression of the air under the effect of the Sun's rays, generated winds inside the cavities of the Earth, creating strong pressures variation, and causing earthquakes.

At first glance, the Aristotle's theory may seem naive, but it's already showing the idea that the Earth is a complete system where the different parts (solid and fluid) interact each other.

Unfortunately, the exchange of energy between the solid Earth and the atmosphere has been forgot in the modern Seismology. However, in the past decade, a number of studies based on space observation have shown that Seismology can cross the limit of the Earth's surface to observe the interactions between the solid Earth and the fluid envelopes (ocean, atmosphere, ionosphere). The observation of earthquakes and tsunamis from space, mainly observing their signature in the ionosphere, opened a new science called *Ionospheric Seismology*, and strongly supported by the CNES.

With this thesis, we wish to accompany the realization of an art installation at the Carmignac Foundation, in Porquerolles, using an airglow camera (provided by ONERA) to observe the spatial flow of OH and see the signature of the vibration of the planet as a single object. The site of Porquerolles, is a light-protected natural park, with a better night than elsewhere in France, considerably increasing the performance of the airglow camera. The images of the camera will be broadcast in a deferred time in a circular dome (inside Fort Saint Agathe, see photo above), a piece of about 10 m in diameter where the spectator will be totally immersed in the spatial image of the flow of OH to feel part of this vibration that the planet Earth transmits to him. The public will be sensitized to this new science and the role of the CNES.

Additionally, the objective we also wish to explore theoretically the role of the space observations in art, in particular focussing on the new perception of the Earth, as a unique system where the solid part and its fluid envelopes are in permanent exchange of energy. Our work will explore how the society is affected and change by space-observations used in art.

#### **The PhD is related to the following tasks:**

##### **Practically>**

- Involvement in the preparation of my next art installation at the *Foundation Carmignac* in 2021. The installation is based on space observation and is related to the vibration of the atmosphere with the ocean and the Earth. It explores the idea of unique, alive and vibrating planet. Work in progress at <https://www.instagram.com/p/B8jBTHOoPy1/>
- The installation is planed for 2021 opening season (May-November). For now there is no discussion about the duration of the installation.

##### **Theoretically>**

- Create a complete cartography of artists and pieces of art related to space-science, with a dynamical cognitive web.
- Explore the iconography of the space-science in the contemporary art, with full attention to the mutation of the meaning of one scientific-image moving to art.
- Evoke the cultural appropriation between art and (space-)science.
- Publish results in books and articles (e.g., Leonardo, MIT press).